PRELIMINARY REPORT ON TORNADOES IN THE UNITED STATES DURING 1936

By J. P. KOHLER

[Weather Bureau, Washington, D. C., February 3, 1937]

In keeping with the custom inaugurated in the December issue of the REVIEW, 1925, and continued each year thereafter, preliminary statements on loss of life and property damage by windstorms during the year 1936 are briefly set forth in this article. A final and more detailed study will appear in the *United States Meteorological Yearbook, 1936*. The data contained in the latter publication prior to 1935 was printed as an integral part of the Report of the Chief of the Weather Bureau.

Practically all the information given in this summary is abstracted from Table III, Severe Local Storms, contained in the several monthly issues of the REVIEW. The contents of the table, Severe Local Storms, have been compiled from the reports of many observers and the various section directors of the Bureau. While it is thought figures given are substantially correct, it must be remembered that all are subject to change after the final study mentioned above.

April and May, each with 21 (possibly 26 and 25, respectively), tornadoes, were the months of greatest tornado frequency, but the total loss of life, 490 (possibly 497), in the month of April greatly exceeded the May fatality figures, which amounted to 13. June and July each had 17 tornadoes, but later study may change the June figure to 24 and the July figure to 19.

Tornado frequency for the remaining months were: January, 4 (6 less than in 1935); February, 3 (29 in 1935); March, 5 (26 in 1935); August, 12 (4 more than in 1935); September, 5 (13 in 1935); November, 1 (3 in 1935); December, 7 (none in 1935). No tornadoes or possible tornadoes were reported during the month of October.

In addition to the 490 deaths during the month of April, and 13 (possibly 14) in May, 18 deaths occurred in January; 4 in March; 9 in June; 3 in July; 2 in August; and 1 in December. No deaths resulted from tornadoes during February and November, although 3 and 1 tornadoes were reported during these months, respectively.

The total property loss caused by tornadoes in 1935 is estimated at over $26,659,900; April, with estimated tornado or tornadic wind damage of $23,509,000, was the month of greatest property loss. The second highest figure was $1,432,000 in March. Losses amounting to slightly more than a half a million were incurred during the months of May and June.

The appalling loss of life and the enormous property damage resulting from tornadoes during the month of April were principally the result of two series of destructive tornadic action in several Southeastern States during the first week of the month.[1]

The first series of tornadoes began about 8:30 p. m., April 1, at Tignall, Ga. At 9 p. m., Lincolntown, Ga., about 17 miles southeast of Tignall, reported a tornado, and 50 houses, more or less, were wrecked or demolished. The next reported tornadic action came from Sasser, Ga., about 6 a. m., April 2. At 7:30 a. m. most likely the same storm struck Leesburg, Ga., which is located 10 miles east of Sasser, Ga., and the storm continued on to Cordele, Ga. One death was reported from each of the two towns, Sasser and Leesburg, Ga., with $3,000 and $4,300 property damage, respectively. The storm was unusually destructive at Cordele, Ga.; 23 persons were killed, 500 injured, and property damage amounted to $3,000,000. One hour later a tornado occurred at Red Lodge, S. C., one farmer was killed and farm property valued at $1,000 reported destroyed. The last recorded instance of this tornado was at Greensboro, N. C. The time of occurrence was shortly after 7 p. m., on April 2. The fatalities numbered 13; 144 were injured, and property damage was estimated at approximately $2,000,000. Perhaps the last remnant of this series was the report of J. F. Hunter, cooperative observer at Arcola, Warren County, N. C., who states: "a heavy cloud and loud roar passed north of me at 9:15 p. m."

The second series of storms began in the northeastern part of Arkansas on the afternoon of April 5. In all, three towns, Melbourne, La Crosse, and Larkin, experienced tornadic disturbances; one death resulted, and property damage amounted to $40,000. The next outbreak was reported from the south-central section of Tennessee; Hardin, Wayne, Lewis, and Maury Counties, all in Tennessee, very likely were affected by the same storm. Six deaths were reported and property damage amounted to $200,000.

At about the time of the Tennessee tornado the northeastern part of Mississippi was visited by a similar storm. Eight deaths and property damage of $35,000 were incurred at Coffeyville and Booneville, Miss., while at Tupelo, Miss., 216 deaths occurred and property damage amounted to $3,500,000. The same tornado in its northeastward movement was felt at Red Bay, Ala., at 9:02 p. m., April 5, and continued in a northeasterly direction, incurring havoc at Belgreen, Rogersville, and Elkwood. Twelve deaths and property damage of $155,000 was reported from the last four named cities in Alabama.

No tornadoes were reported between 11 p. m. on the 5th and the early morning of the 6th, when without question the greatest disaster of the entire series occurred in northern Georgia. About 8:30 a. m. of this date one occurred about a mile north of Acworth, where a store and a grist mill were completely demolished. Other buildings were damaged but no deaths resulted.

About the same time as the tornado struck near Acworth, or perhaps a few minutes earlier, if the time of occurrences are correctly reported, the Gainesville and New Holland tornado occurred; 203 deaths were reported, while 934 others were injured. The last tornado of this series in Georgia was reported at Lavonia about 9:30 a. m., and Anderson, S. C., which is east-northeast of Lavonia, reported a tornado at 10:05 a. m., which perhaps was a continuation of the Georgia series, and also the last reported instance.

According to J. B. Kincer of the Weather Bureau, who made a very detailed study of the series, as well as other notable tornado disasters in the United States "the group of tornadoes comprised by these two series, considering the number of people killed and injured and the property damage, probably ranks third in destructiveness in the tornadic history of the United States." In general, in the first series of April 1–2, about 41 persons were killed and 540 injured; in the second, April 5–6, some 452 persons were killed and 1,775 were injured.

The total number of tornadoes during the year, approximately 113, was 69 less than in the preceding year. The total number of deaths resulting from the 1936 storms were estimated at 540, which is 372 above the average.

[1] For more detailed description see "Tornado Disasters in the Southeastern States". by J. B. Kincer, MONTHLY WEATHER REVIEW, May 1936.

If further study shows the storms listed in the table of tornadic winds to be true tornadoes, the 1936 number will be 135 tornadoes, 550 deaths, and property losses exceeding $26,902,500.

TORNADOES AND PROBABLE TORNADOES

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Number	4	3	5	21	21	17	17	12	5	0	1	7	113
Deaths	18	0	4	490	13	9	3	2	0		0	1	540
Damage [1]	53.5	33.0	1,381.5	23,483.3	504.0	522.9	230.7	170.2	44.8		75.0	158.0	26,656.9

[1] In thousands of dollars.

TORNADIC WINDS AND POSSIBLE TORNADOES [2]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Number	0	0	3	5	4	7	2	1	0	0	0	0	22
Deaths			0	7	1	2	0	0					10
Damage [1]			50.5	25.8	20.2	124.1	25.0	(3)					245.6

[2] Some of these may not be classed as tornadoes in the final study.
[3] Damage occurred, no estimate obtained.

TROPICAL DISTURBANCES OF 1936

By I. R. TANNEHILL

[Weather Bureau, Washington, January 1937]

During the hurricane season of 1936 (June to November, inclusive), 17 tropical disturbances were charted over the North Atlantic Ocean, including the Caribbean Sea and Gulf of Mexico. This is the second largest number ever recorded in a single season, having been exceeded only by 21 in 1933.

The percentage which reached full hurricane intensity was unusually small in 1936. During the 50-year period, 1887 to 1936, inclusive, slightly more than 50 percent of all tropical disturbances of record were of full hurricane intensity, whereas during 1936 only 5 out of 17, or slightly less than 30 percent, were of known hurricane force. There was only one hurricane out of 6 disturbances in August; during that month more than 70 percent normally are fully developed hurricanes.

A synopsis of the outstanding features of the 17 disturbances of 1936 is given in the appended table.

While the number of disturbances during 1936 was unusually large and many of them were of minor character, it is not believed that the excess is due in any considerable measure to increased facilities for reporting them. In fact there were three disturbed conditions in tropical waters during the 1936 season that have not been listed in the table. The first of these reached the southern coast of Haiti on June 24, causing some loss of life and the grounding of the S. S. *Baron Ogilvy*. There were insufficient reports in this case to show definite cyclonic character. On July 12 and 13, and again on July 21 and 22, there were disturbed conditions in the southwestern Gulf and near Puerto Rico, respectively, which were probably cyclonic but of very mild character. On the whole it must be considered an extraordinarily active season for the genesis of tropical disturbances, but one in which conditions were infrequently favorable for full development.

In respect to another feature, also, the season was an unusual one: From an examination of the accompanying track chart it will be seen that there was a remarkable deficiency of tropical storms in the Caribbean Sea. While it appears that several which crossed the Gulf had their origin in the extreme western Caribbean, the courses of nearly all of the season's disturbances lay wholly, or almost entirely, outside the Caribbean.

Of the five hurricanes, two crossed the coasts of the United States, and one, the great hurricane of mid-September, passed very near the Middle and North Atlantic coast. Loss of life and damage to property during the season were relatively small, however. Warnings and advices which were timely, frequent, and accurate, contributed largely to the preservation of life and property, notably in connection with the September hurricane on the coasts of North Carolina, Virginia, Maryland, Delaware, and New Jersey.

Synopsis of tropical storms 1936 (number of storm in table corresponds with number of track on accompanying chart

Storm	Date	Place where first reported	Coast lines crossed	Maximum wind velocity reported	Lowest barometer reported	Place of dissipation	Intensity	Remarks
I	June 11-17	Bay of Honduras	Mexico, Florida	Force 9, on 2 steamships.	29.46, S. S. *Duquesne*	North Atlantic	Not of hurricane intensity.	Probably crossed Central America from Pacific. A.
II	June 19-21	Near Yucatan	Mexico	Force 8, S. S. *Cayo Mambi.*	29.52, S. S. *Cayo Mambi.*	Mexico	do	
III	June 26-27	Gulf, east of Brownsville.	Texas	80,[1] WNW., Port Aransas.	29.16, fishing vessel *Sea Gull*	Southern Texas	Probably of hurricane intensity.	Property damage $550,000. A.
IV	July 26-28	Near western Cuba.	Louisiana	50,[1] at Delta Farms, La.	29.62, Delta Farms, La.	Mississippi	Not of hurricane intensity.	B.
V	July 27-Aug. 1	Southeastern Bahamas.	Florida	90-100,[1] ENE., Valparaiso, Fla.	28.73, Valparaiso, Fla.	Alabama	Hurricane	Property damage $150,000. B.
VI	Aug. 4-9	Near 20° N., 60° W.	Newfoundland			North Atlantic	Minor	
VII	Aug. 8-12	Gulf, south of Louisiana.	Mexico			Mexico	Not of hurricane intensity.	
VIII	Aug. 15-19	Gulf, near Yucatan Channel.	do	Force 9, S. S. *Cauto*	29.56, S. S. *Cauto*	do	Doubtful, but near hurricane intensity.	
IX	Aug. 20-22	Bahamas	Florida	55, SW., Titusville, Fla.	29.60, Titusville, Fla.	Middle Gulf Coast.	Not of hurricane intensity.	C.
X	Aug. 28-30	Near east coast of Yucatan.	Mexico	Force 11, S. S. *Cayo Mambi.*	29.52, S. S. *Cayo Mambi*	Mexico	Doubtful but near hurricane intensity.	
XI	Aug. 28-Sept. 5	Near 17° N., 43° W.	None	Force 12 S. S. *West Lashaway.*	28.32, S. S. *Nike*	North Atlantic	Hurricane	D.
XII	Sept. 7, 8	Near 20° N., 55° W.	do			Near 22° N., 65° W.	Minor	

[1] Estimated.